

Appln. No. 10/074,514
Amdt. dated October 19, 2004
Reply to Office Action dated August 5, 2004

Remarks/Arguments

These remarks are in response to the Office Action dated August 5, 2004. This reply is timely filed.

At the time of the Office Action, claims 1-14 were pending in the application. Claims 1-5, 7, 8-12, and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,188,875 to Evans (Evans) in view of U.S. Patent Publication No. 2001/0016504 to Dam et al. (Dam). Claims 6 and 13 were also rejected under 35 U.S.C. §103(a) as being unpatentable over Evans in view of Dam and further in view of U.S. Patent No. 6,124,824 to Xu et al. (Xu). The rejections are set out in more detail below.

I. Brief Review of Applicants' Invention

Prior to addressing the Examiner's rejections on the art, a brief review of Applicants' invention is appropriate. The invention relates to an adaptation of smart antenna technology to the field of base-repeater communications in wireless mobile telephone networks. Smart antennas are known in the art for their ability to spatially isolate selected communication links in order to reduce interference. However, despite the advances in this field, use of adaptive antennas in wireless mobile communications systems has met with only limited success. This limited success has been attributed in part to the tremendous computational demands associated with adaptive beam-forming required to effectively accommodate a large number of mobile units.

In-band RF backhaul links are similarly known in the art in repeater based communications systems. However, such backhaul links tend to consume valuable RF spectrum that has been licensed to a communication service provider. As the number of repeaters communicating with a particular base station increases, additional RF

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spectrum must be allocated for each repeater to accommodate the additional backhaul links between each repeater and the base station. The increasing use of licensed RF spectrum for accommodating backhaul links is undesirable because it reduces the available RF frequencies for communicating with mobile subscriber units. The present invention provides a long needed solution to the foregoing problem.

More particularly, the invention offers a hybrid approach that allows mobile communications systems to benefit from smart antenna systems while operating within their most significant limitations. In particular, the system makes use of smart antenna technology as part of the wireless network, but does so in connection with the fixed point communications links associated with the repeater backhauls. This approach is not shown or suggested in the prior art.

II. Claim Rejections on Art

In the Office Action, claims 1-5, 7, 8-12, and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,188,875 to Evans (Evans) in view of U.S. Patent Publication No. 2001/0016504 to Dam et al. (Dam).

Evans discloses what is described as a wireless telephone server system that is used for reproducing a wireless base station signal, and introducing the reproduced signal in a new geographic area. The device is similar to a conventional RF repeater. Significantly, however, Evans does not discuss the use of smart antennas at all. In fact, Evans does not even recognize the problem of spectrum loss that is associated with the use of in-band backhaul frequencies.

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The Examiner concedes that:

Evans does not explicitly disclose controlling a first smart antenna system of said first base station for improved spectral efficiency by selectively configuring said first smart antenna system to spatially isolate communications on said first RF backhaul from communications on a second RF backhaul of a second repeater.

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However, the Examiner nevertheless asserts that "the preceding limitation is well known in the art of telecommunications." In support of this assertion, the Examiner cites Dam et al reference.

According to the Examiner, Dam et al. teaches a system and method to control electromagnetic signals in a radio base station to drive a plurality of beams in order to achieve a great deal of flexibility, which is exploited to improve efficiency and system capacity. Significantly, however, Applicants can find no mention in Dam et al. of improving spectral efficiency by selectively configuring a smart antenna system to spatially isolate repeater backhaul communications on a first RF backhaul from communications on a second repeater RF backhaul.

Dam et al. simply discloses a radio base station in which a beamforming network permits the transceiver to be variably connected to different types of antenna structures for communicating with mobile subscriber units. See Dam et al., Paragraph 41-42 and Claim 1. Thus, Dam et al. also fails to disclose the use of smart antenna technology for communications on a backhaul link between a base station and repeater for improved spectrum efficiency. In view of the foregoing, the combination of Evans and Dam et al. is not believed to be sufficient to support the Examiner's rejection under 35 U.S.C.

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§103(a). Neither reference discloses or suggests use of smart antennas for backhaul communications between repeaters and base stations in a mobile telephone communication network.

Moreover, like Evans, Dam et al. completely fails to even recognize the problem of spectrum loss associated with repeater backhaul communications. Consequently, rather than bolstering the disclosure of Evans, it is apparent that the combination of Evans with Dam et al. actually teaches away from Applicants' invention.

Even if one were to combine the teachings of Evans with Dam et al. as suggested by the Examiner, the combination would not teach Applicants' invention. Evans teaches the use of a repeater and Dam et al. teaches the use of smart antenna technology for communicating with mobile subscriber units. At best the combination would be a repeater that communicates with mobile subscriber units using smart antenna technology. In contrast, Applicants' invention is not directed to using smart antenna technology for communicating with the numerous mobile units because of the practical difficulties inherent in such an approach.

Applicants claims recite a system which uses smart antenna technology for repeater backhaul links, which are stationary and limited in number. Applicants approach greatly reduces the technological complexity of the solution while still gaining a significant advantage in spectrum efficiency. In view of the foregoing, Applicants respectfully submit that the combination of Evans and Dam et al. do not render obvious Applicants' claimed invention.

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Applicants wish to remind the Examiner of the guidance offered by the MPEP as concerns obviousness rejections. The MPEP clearly cautions against concluding that modifications of the prior art meet a claimed invention merely on the basis that they are within the ordinary skill of the art at the time the claimed invention was made. MPEP § 2143.01 The MPEP provides that even where the references relied upon teach that all aspects of the claimed invention were individually known in the art, this fact is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. MPEP § 2143.01. Moreover, the prior art itself must suggest the desirability of the combination. MPEP § 2143.01. None of these criteria appear to be met by the Examiner's rejection. In the present case, there is nothing in either of the cited references that even appears to recognize the problem of spectrum loss associated with in-band backhaul communications between a repeater and a base station. See also *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000) (Court reversed obviousness rejection involving technologically simple concept because there was no finding as to the principle or specific understanding within the knowledge of a skilled artisan that would have motivated the skilled artisan to make the claimed invention); *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references.).

The Examiner also rejected claims 6 and 13 under 35 U.S.C. §103(a) as being unpatentable over the combination of Evans in view of Dam et al. and further in view of U.S. Patent No. 6,124,824 to Xu et al. However, Xu et al. fails to make up for the

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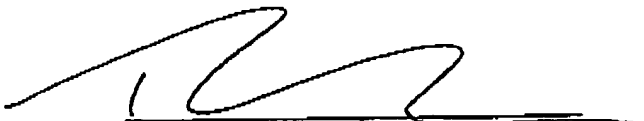
deficiencies of Evans and Dam et al. In fact, Xu et al. merely discloses a calibration system for an adaptive antenna array. Xu relies upon a remote station to determine variations in gain and phase of components of an adaptive array subsystem. The remote station produces a calibration signal in response to the signals produced by the adaptive array subsystem. See Xu et al., Col. 3, lines 15-37, Col. 4, lines 15-20. Notably, Xu et al. does not disclose the use of smart antenna technology for communications on a backhaul link between a base station and one or more repeaters for improved spectrum efficiency. Accordingly, the combination of Evans, Dam et al. and Xu et al. also fails to teach the claimed invention.

Conclusion

For the foregoing reasons, this entire application is believed to be in condition for allowance. Consequently, such action is respectfully requested. The Applicant requests that the Examiner call the undersigned if clarification is needed on any matter within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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